Answer all questions

Q(1) Answer the following: [5 marks]

1. Noise can be defined as an additional signal inserted between transmitter and receiver. Explain the four types of noise that are usually present in communication systems. [4 marks]
2. Explain the signal to noise ratio and write the equation relating the signal strength to nose strength. [1 mark]

Q(2) Solve the following problem: [3 marks]

1. Calculate the bandwidth for a spectrum of channels between 5MHz and 9MHz with a signal to noise ratio SNR_{dB} = 18 dB.
2. How many signaling levels are required?

Q(3) Answer the following questions: [5 marks]

1. What does CSMA/CD stand for? Explain its terms.
2. What is the difference between segment and port switching?
3. What are the important factors that separate switches from other devices?

Q(4) Answer the following questions: [7 Marks]

1. Produce a table explaining the various network classes from the 1st byte.
2. Why the class based addressing is not suitable for routing? What is the solution for this problem?
3. Write the following addresses:
   a. The default route address.
   b. Loop back addresses.
   c. Broadcast address.

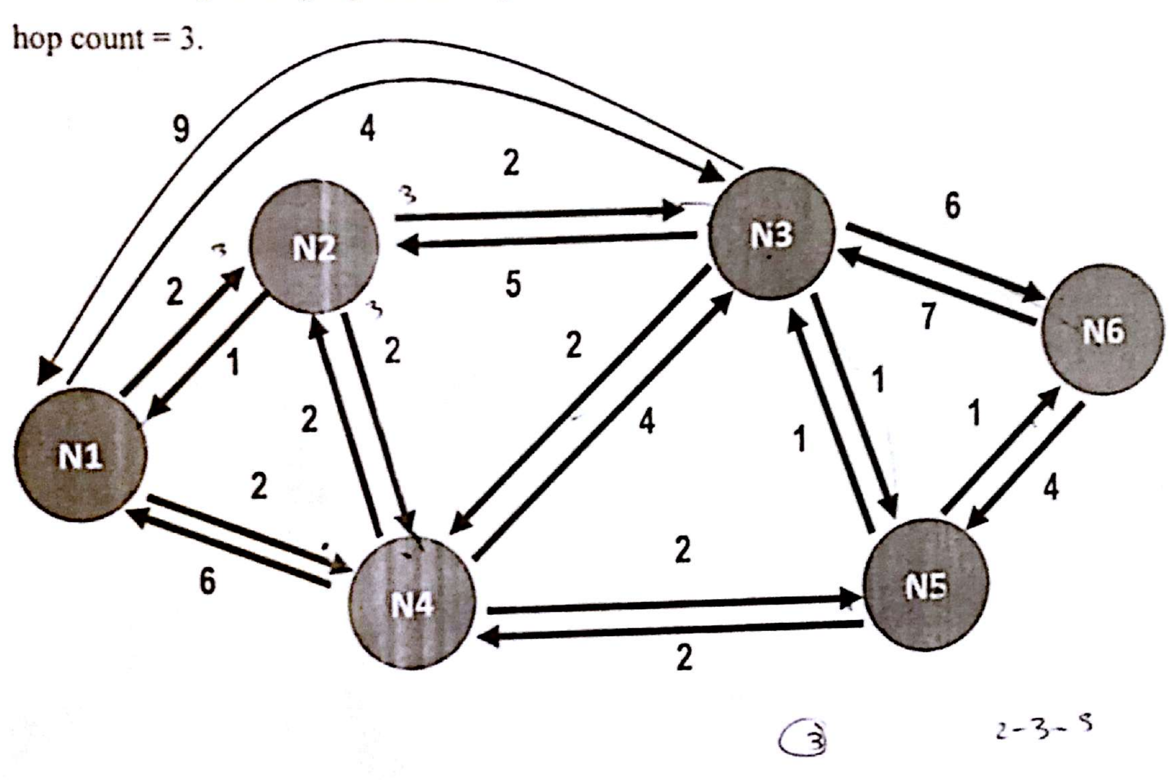
Good Luck

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Q(5) Answer the following questions: [10 marks]

L(8) P8 1. Use the figure shown below, develop a fixed routing table for packets travel from node 2 to node 6. The table should show; destination node, cost and next node.

P 12 2. For the same figure and **ignoring** the indicated costs, redraw this figure showing how to use flooding routing algorithm for packets traveling from node 2 to node 6. Assume hop count = 3.

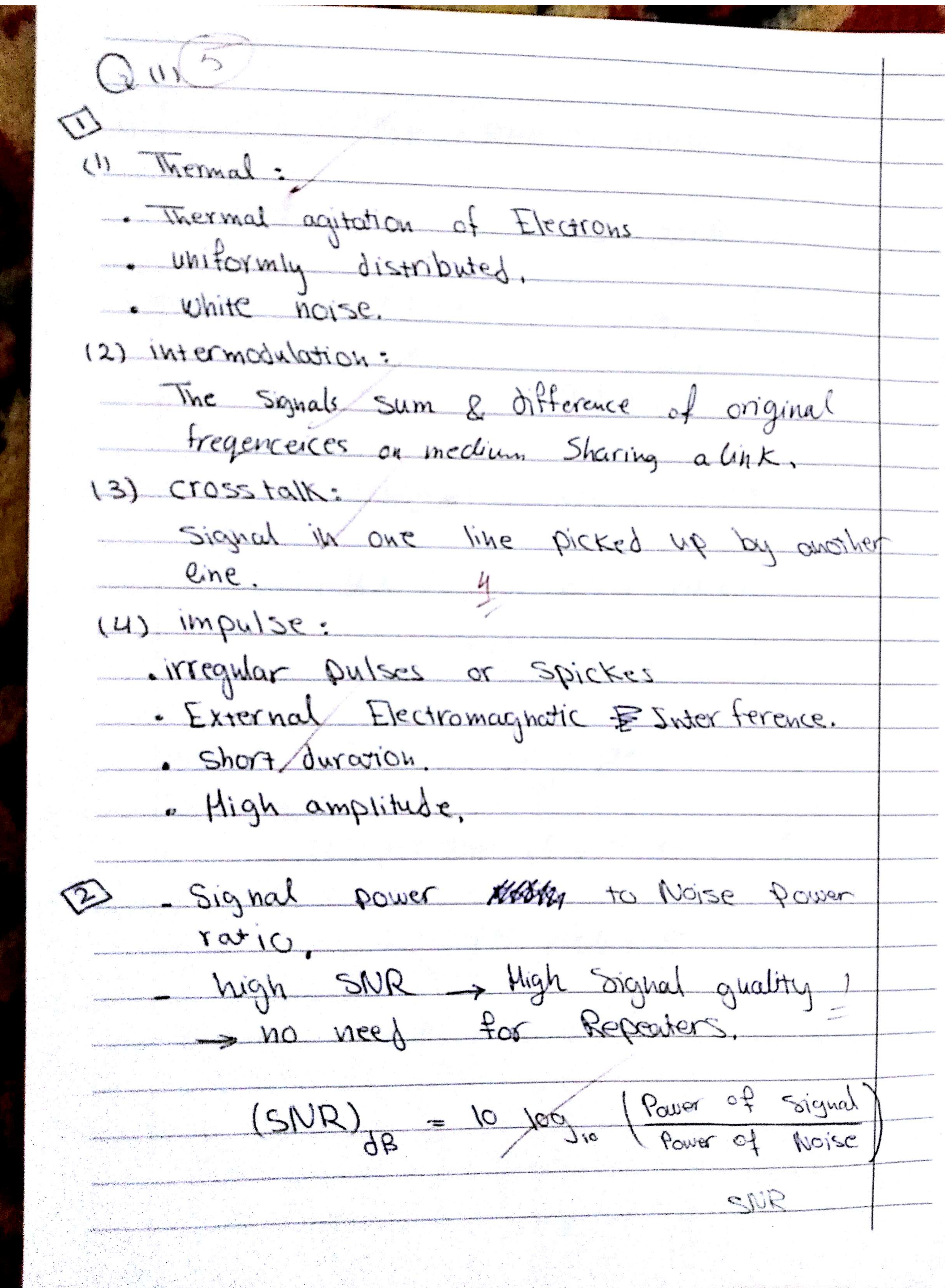


(3) 2-3-5

2-1-4-5-6
7 2-4-5-6
5 2-3-5-6
4

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Good Luck


Q (1) 5

1

(1) Thermal :
- Thermal agitation of Electrons
- uniformly distributed.
- White noise.

(2) intermodulation :
The signals sum & difference of original freqenceices on medium sharing a link.

(3) cross talk:
Signal in one line picked up by another line.

4

(4) impulse :
- irregular pulses or spickes
- External Electromagnatic ~~E~~ Interference.
- Short duration.
- High amplitude.

2

- Signal power ~~[illegible]~~ to Noise power ratio.
- high SNR → High signal quality → no need for Repeaters.

$$(SNR)_{dB} = 10 \log_{10} \left(\frac{\text{Power of Signal}}{\text{Power of Noise}} \right)$$

SNR

Q2-3

1. $BW = 9MHz - 5MHz = 4MHz$ #

2. $C = B\log_2(1+SNR)$

$C = 4MHz \log_2(1+63)$

$C = 24 Mbps$ ✓

$(SNR)_{dB} = 10\log_{10}(SNR)$

$18 db = 10\log_{10}(SNR)$

$SNR = 10^{(1.8)} = 63.0957$ #

$C = 2B\log_2 M$

$24 Mbps = 2 \times 4MHz \log_2(M)$

$3 = \log_2(M)$ ✓

$M = 8$ level #

Q3 (5)

[I] CSMA / CD

Carrier Sence , Multiple access, collsion detect

- Carrier Sence : each station cheak if other stations are Transmitting if So, station can't catch (carrier) and can't Transmit, station will Keep cheacking until The (carrier) become available" and Network become idle. to Transmit The Data.

2

- Collsion detect : when Two station Transmitting at The Same Time & Their signal is collide The Transmitting will Stop and Try again after Random Time.

- Multiple access : each station connected to it's neighbors station.

2 . Segment Switching: each port allow connection of higher number of work station with fewer switches

1.5

. Port Switching: single device on single port, expensive Than Segment Switching need more wires & enough switches.

. ~~[illegible]~~ more butter network even if it is expesi

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3

① overall speed
② electronic logic (Smarter) 1.5
③ high port count.

4.0

Q4

I

0	reseved for Network
1 — 126	Class A
127	reseved for loopback
128 — 191	Class B
192 — 223	Class C
224 — 225	Reseved (Class D)

3

2

Subnetting : Subdivide large Network to smaller Networks,

3 a, default route 0.0.0.0

b) loop back 127.0.0.0

c, Broadcast 255.255. 0 . 0 → Class B

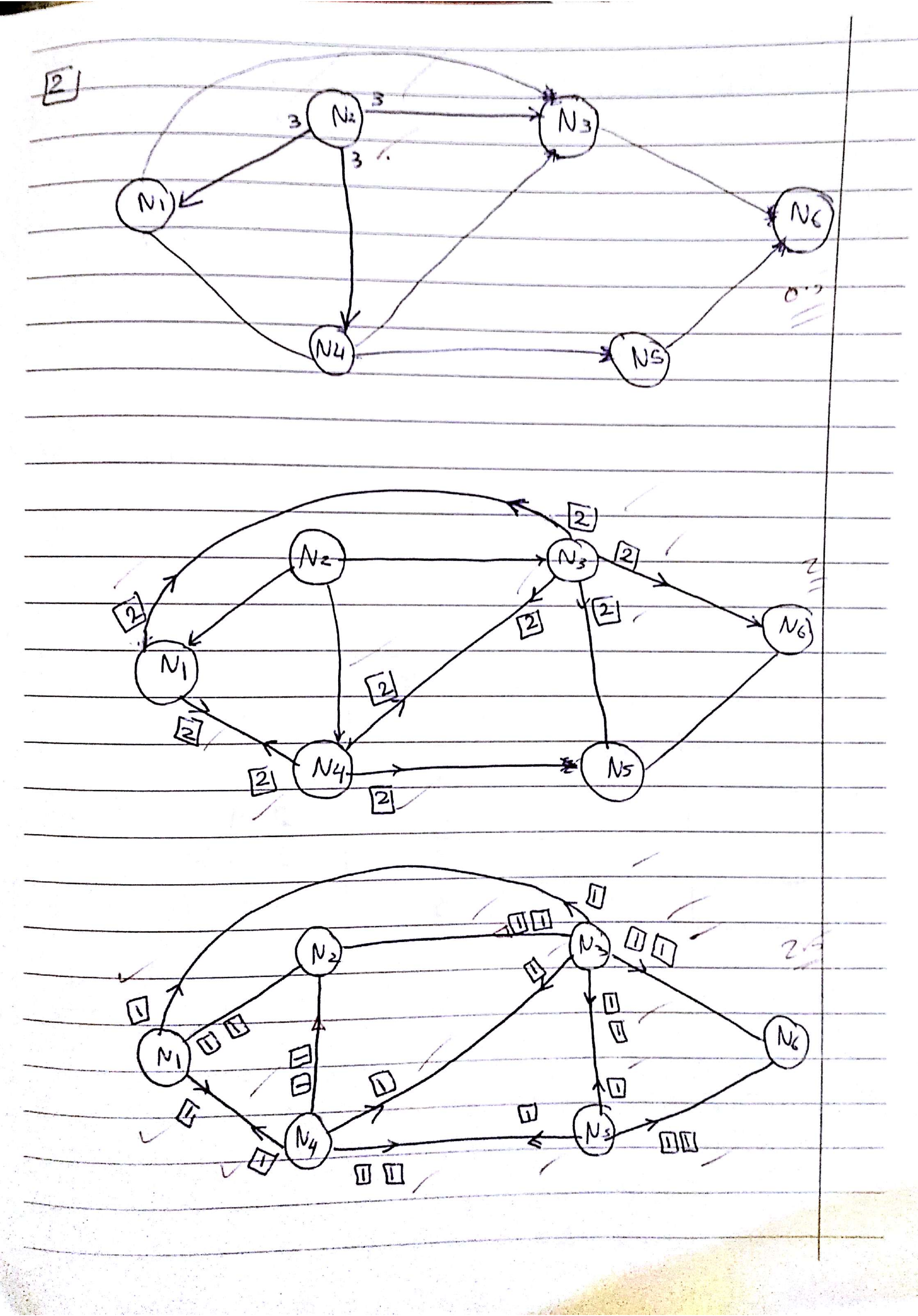
↳ Network Part = 255

Q5 10

I Fixed Routing

Destenition	Cost	Next Node	Path
1	1	1	2-1
3	2	3	2-3
4	2	4	2-4
5	3	3	2-3-5
6	4	3	2-3-5-6

2


2
N2
3
3
3
N3
N1
N6
N4
N5
N2
N3
2
2
2
2
N1
N6
2
2
2
N4
N5
2
2
N2
N3
N1
N6
N4
N5